PTO/SB/08A (10/01) (Substitute for form 1449A/PTO)

## INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use several sheets if necessary)

Sheet \_\_\_1\_\_ of \_\_\_3\_

ATTY. DOCKET NO. UMC-96-279 CON

Client/Matter No. 81848.0016.001

FIRST NAMED INVENTOR:

CHIH-CHIEN LIU

FILING DATE **APRIL 11, 2000**  **APPLICATION NO.: 09/546,174** 

ART UNIT 1711 8 1 9 2003

## **U.S. PATENT DOCUMENTS**

| Examiner<br>Initials | Cite<br>No. | Document No.<br>No. – Kind Code | Publication Date<br>MM-DD-YYYY | Name of Patentee or<br>Applicant of Cited Doc | C(ass<br>Pages, Columns<br>Passages or Re | Lines, Where Relevant |
|----------------------|-------------|---------------------------------|--------------------------------|---|---|-----------------------|
| RA                   |             | 5,843,836                       | 12/01/1998                     | Cheung et al.                                 | 438                                       | 626                   |
| RI                   |             | 5,851,899                       | 12/22/1998                     | Weigand                                       | 428                                       | 427                   |
| R                    |             | 5,858,869                       | 01/12/1999                     | Chen et al.                                   | 438                                       | 597                   |
| RS                   |             | 5,885,894                       | 03/23/1999                     | Wu et al.                                     | 438                                       | 624                   |
| RS                   |             | 5,913,140                       | 06/15/1999                     | Roche et al.                                  | 438                                       | 624                   |
| RS                   |             | 6,117,345                       | 09/12/2000                     | Liu et al.                                    | 216                                       | 19                    |
| RS                   |             | 5,854,126                       | 12/29/1998                     | Tobben et al.                                 | 438                                       | 626                   |
| RS                   |             | 5,219,788                       | 06/15/1993                     | Abernathey et al.                             | 437                                       | 187                   |
| AA                   |             | 5,580,701                       | 12/03/1996                     | Lur et al.                                    | 430                                       | 316                   |
| RA                   |             | 5,968,610                       | 10/19/1999                     | Liu et al.                                    | 427                                       | 579                   |
| RA.                  |             | 4,820,611                       | 04/11/1989                     | Arnold, III et al.                            | 430                                       | 271                   |
| N                    |             | 5,378,659                       | 01/03/1995                     | Roman et al.                                  | 437                                       | 229                   |
| RA                   |             | 5,656,543                       | 08/12/1997                     | Chung   | 438                                       | 625                   |
| RS                   |             | 5,700,737                       | 12/23/1997                     | Yu et al.                                     | 438                                       | 636                   |
| RS                   |             | 5,737,388                       | 04/07/1998                     | Kossila                                       | 378                                       | 168                   |
| RS                   |             | 5,759,746                       | 06/02/1998                     | Azuma et al.                                  | 430                                       | 313                   |
| Rid                  |             | 5,759,916                       | 06/02/1998                     | Hsu et al.                                    | 438                                       | 636                   |
| RS                   |             | 5,780,323                       | 07/14/1998                     | Forouhi et al.                                | 438                                       | 131                   |
| RA                   |             | 5,918,147                       | 06/29/1999                     | Filipiak et al.                               | 438                                       | 636                   |
| RI                   |             | 5,494,854                       | 02/27/1996                     | Jain  | 437                                       | 195                   |
| RA                   |             | 4,491,628                       | 01/01/985                      | lto et al.                                    | 430                                       | 176                   |

## FOREIGN PATENT DOCUMENTS

| Examiner<br>Initials | Cite<br>No. | Foreign Patent Doc<br>cntry code – No. – Kind Code | Publication Date<br>MM-DD-YYYY | Name of Patentee or<br>Applicant of Cited Doc | Pages, Columns. Lines<br>Where Relevant Passages<br>or Relevant Figures Appear | TRANSLATION |    |
|----------------------|-------------|--|--------------------------------|---|--|-------------|----|
|                      |             |  |                                |   |  | YES         | NO |
|                      |             |  |                                | -   |  |             |    |

Rubin fryst

FILE COPY

| OE JO     |   |
|-----------|---|
| Si A      | · **                                      |
|           | N. S. |
| Attract & | € <sup>₹</sup> OTI                        |

|                      | T           | OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS   |
|----------------------|-------------|---|
| Examiner<br>Initials | Cite<br>No. | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial symposium, catalog, etc.), date, page(s), volume-issue number(s) publisher, city and/or country where published                    |
| RS                   |             | J.T. Pye, et al. "High-density plasma CVD and CMP for 0.25-µm intermetal dielectric processing," Solid State Technology, December 1, 1995, pp. 65-69  |
| RS                   | d           | J.T. Pan, et al. "Integrated Interconnect Module Development," VMIC, 1996 ISMIC, June 18-20, 1996, pp.46-51   |
| RS                   | •           | S. Nag, et al. "Integration of ICP High-Density Plasma Inter-Level Dielectric Films Into a 0.35 μ.m. CMOS Five-Level Interconnect System," June 27-29, 1995 VMIC Conference, 1995 ISMIC, pp. 24-30  |
| RS                   |             | Jiro Yota, et al. "Integration of ICP High-Density Plasma CVD with CMP and Its Effects on Planarity for Sub-0.5 μ.m. CMOS Technology," SPIE Vol. 2875, pp. 265-274, 199   |
| RA                   | •.          | Haruyoshi Yagi, "Multilevel interconnection technology in system LSI,"  |
| RS                   | •           | Toshihiko Tanaka, "A novel antireflection method with gradient photoabsorption for optical lithography," SPIE Vol. 2726, pp. 573-582  |
| RS                   | 4           | PSE Technical Conference, Las Vegas, April 14-19, 1996, Applied Materials, Inc.   |
| RS                   | ,           | Seung Gol Lee, et al. "Optimal design of antireflective layer for DUV lithography and their experimental results," SPIE Vol. 3049, pp. 409-418  |
| RS                   |             | Stephan E. Lassig, et al. "Gap Fill Using High Density Plasma CVD," February 21-22, 1995 DUMIC Conference, 1995 ISMIC, pp. 190-196  |
| RS                   |             | G. Gagnon, et al. "Effect of a TiN anti-reflecting coating on the performance of Ti/TiN/AlSiCu metallization of VLSI devices," June 18-20, 1996 VMIC Conference, 1996 ISMIC, pp. 527-529  |
| RS                   |             | B. Fowler, et al. "Relationships between the material properties of silicon oxide films deposited by electron cyclotron resonance chemical vapor deposition and their use as an indicator of the dielectric constant," J. Vac. Sci. Technol. B 12(1), Jan/Feb 1994, pp. 441-448 |
| RA                   | ٠           | Han J. Dijkstra, et al. Optimization of Anti-Reflection Layers for Deep UV Lithography," SPIE Vol. 1927 (1993), pp. 275-286   |
| RS                   |             | "CVD/CMP 0.25μ.m and Beyond Technology Seminar," April 30, 1996, Technology Seminar, Applied Materials Taiwan   |
| RS                   | 4           | David Cheung, et al. "Plasma Silane Technology, Dielectric CVD I," NARA CVD Product Training, May 1996, Applied Materials, Inc.   |
| RS                   | 3           | S. Logothetidis, et al. "Room temperature oxidation behavior of TIN thin films," Thin Solid Films, Elsevier Science S.A. 1999, pp. 304-313  |
| LS                   | •           | A. Bendavid, et al. "Deposition and modification of titanium dioxide thin films by filtered arc deposition," Thin Solid Films, Elsevier Science S.A. 2000, pp. 241-249  |
| RS                   | •           | S. A. Campbell, et al. "Titanium dioxide (TiO <sub>2</sub> )-based gate insulators," IBM Journal of Research and Development, Vol. 43, No. 3, May, 1999, pp. 383-391  |
| RS                   | •           | S. Gwo, et al. "Local electric-field-induced oxidation of titanium nitride films," American Institute of Physics, Applied Physics Letters, Vol. 74, No. 8, February 22, 1999, pp. 1090-1092   |
| RA                   | ۴           | T. Bacci, et al. "Microstructural Analysis and Crystallographic Characterisation of Plasma Oxynitrided Ti-6Al-4V," IoM Communications Ltd. 2000, pp. 37-42  |
| RJ                   | (           | Fu-Hsing Lu, et al. "XPS analysis of TiN films on Cu substrates after annealing in the controlled atmosphere," Thin Solid Films, Elsevier Science S.A. 1999, pp. 374-379  |
| RS                   | ι           | Stanley Wolf, Ph.D., et al. "Silicon Processing for the VLSI Era Volume 1: Process Technology," Lattice Press, California, 1986, pp. 371-373  |
| RS                   | · ·         | Harland G. Tompkins, et al. <i>"Oxidation of TiN in an oxygen plasma asher,"</i> Journal of Vacuum Science and Technology, Vol. 12. Issue 4, July/August 1994, pp. 2446-2450  |
| RS                   | •.          | Hiroshi Kubota, et al. "Oxidation of TiN thin films in an ion-beam-assisted deposition process," Elsevier, Applied Surface Science 82/83 (1994) pp. 565-568   |
| RS                   | N.          | Christopher Bencher, et al. "Dielectric antireflective coatings for DUV lithography," Solid State Technology, Vol. 1, No. 3, March 1, 1997 pp. 109-114  |
| RS                   | 7           | Tohru Ogawa, et al. "SiOxNy:H, high performance anti-reflective layer for the current and future optical lithography," LSI Basic Process Technology Division, ULSI R&D Laboratories, SONY Corporation. SPIE Vol. 2197, 1/94 pp. 722-732   |

111DE - 81848/0016 - 167435 v1 Ruly Lyst

6/103 FILE COPY

09/546,174

Kim R. Dean, et al. *"Investigation of deep ultraviolet photoresists on TiN substrates,"* SEMATECH, Austin, Texas, SPIE Vol. 2438, 6/95 pp. 514-528

Qizhi He, et al. "Investigating Positive DUV Resist Profile on TiN," Semiconductor Process and Device Center, Texas Instruments, Dallas, TX, SPIE Vol. 3049, 1997, pp. 988-996

EXAMINER SIGNATURE

**DATE CONSIDERED** 

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through that in conformance and not considered. Include copy of this form with next communication to applicant.

MAE GUPY